KANSAS UNIVERSITY SCIENCE BULLETIN.

VOL. IV, No. 10. SEPTEMBER, 1908. { WHOLE SERIES, VOL XIV, No. 10.

# RESTORATION OF THE SKELETON OF BISON OCCIDENTALIS.

BY C. E. McCLUNG.

(Contribution from the Zoölogical Laboratory, No. 177.)

Plate XIV.

ONE of the most interesting and striking specimens in the paleontological museum has just been placed in its case. This is a specimen of the extinct *Bison occidentalis*, collected and mounted by Mr. H. T. Martin. This, I believe, is the first time that a complete skeleton of one of our ancient bisons has been assembled, and the technical excellence with which the mounting has been done by Mr. Martin is worthy of this distinction. The skull of this specimen has been described by Mr. Alban Stewart under the name of *Bison antiquus* (Kansas University Quarterly, vol. 6, No. 3), and by Mr. F. A. Lucas (Proceedings of the United States National Museum, vol. 21, 1899) as *Bison occidentalis*. For this reason a detailed description of the cranium is hardly necessary. For the sake of completeness a statement of the circumstances connected with the discovery of the specimen will be given, although this has also been reported by Dr. S. W. Williston.

Particular importance attaches to the finding of this specimen, for during its removal an Indian arrow-head was discovered beneath the right scapula. I give Mr. Martin's own account of its history herewith:

"In the summer of 1895 Mr. T. R. Overton and I were collecting in the vicinity of Russell Springs, Logan county, Kansas, when our attention was called to some mammalian teeth found by Mr. Charles Wood. An examination of the teeth disclosed the fact that they belonged to an extinct form of bison.

Mr. Wood kindly accompanied us to the place where he had discovered the specimens in the bed of a small tributary of the Smoky Hill river. This is usually a dry creek, but the recent heavy rains had filled it and had strongly undercut the banks. A close examination of the exposure disclosed several fragments of bones exposed in a thin layer of bluish-gray marl. This material was deposited in a slight depression made by erosion in the Cretaceous chalk which lay immediately below.

"Subsequent excavations revealed the presence of seven or eight skeletons, all crowded within a space ten feet square. These were removed and the large bull has been mounted. In endeavoring to account for the presence of this number of individuals in so small an area it has seemed to me that there is only one explanation. The bone bed lay at the west edge of an old Cretaceous canyon of some 200 yards' width, running north and south, and in a smaller one running east and west. It is supposed that the small herd of bisons was driven by a severe northwest storm along under the northern bluffs of the small east and west canyon. Coming to the intersection of this with the deep north and south canyon they were stopped by the sharp descent, and, huddled under the protecting cliff, finally perished.

"The presence of the arrow-head can be accounted for only on the supposition that it was fixed in the flesh of the animal. The fact that the arrow-head was firmly imbedded in the solid matrix directly under the scapula, at least twelve feet back from the edge of the cliff and under twenty-five feet of deposited soil, precludes the possibility of its having been subsequently introduced."

For comparison with the common *Bison bison* I give, side by side, the measurements of a medium-sized bull of this species and corresponding ones of the extinct form:

| | *Inches.* | *Inches.* |
|---|---|---|
| Length from tip of nose to tip of tail | 106 | 122 |
| Height at level of longest neural spine | 63 | 79½ |
| Height at level of hind leg | 55 | 62 |
| Height of fore leg, without scapula | 36 | 37½ |
| Height of hind leg | 46 | 51½ |
| Length of scapula | 19⅞ | 22 |
| Length of pelvis | 19⅞ | 23 |
| Extreme depth of barrel | 36 | 50 |

| | *Inches.* | *Inches.* |
|---|---|---|
| Extreme width of barrel at tenth rib | 22½ | 25½ |
| Length of humerus | 15 | 15½ |
| Length of femur | 16¾ | 20½ |
| Least circumference of humerus | 6 | 7¾ |
| Least circumference of femur | 6¼ | 6⅝ |
| Diameter of humeroradial joint | 3½ | 4¼ |
| Diameter of femurotibial joint | 4⅜ | 5½ |
| Width of 5th cervical vertebra across transverse processes | 5½ | 5⅞ |
| Length of fore leg, exclusive of humerus | 26 | 29½ |
| Length of hind leg, exclusive of femur | 32 | 36 |
| Diameter of tibiotarsal joint | 2⅝ | 3⅜ |
| Diameter of humerocarpal joint | 3¼ | 4½ |
| Length of longest dorsal spine | 18 | 25 |
| Diameter of humeroradial joint in per cent. of humerus length | 23.3 | 27.4 |
| Diameter of femurotibial joint in per cent. of femur length | 26.1 | 26.8 |

An examination of these figures will show that the extinct species was considerably larger than the living one, and that it differed materially in some respects from the one with which we are familiar. In the extremes of length and height there are differences of sixteen inches. On the contrary, in the pelvic region there is a variation of only seven inches in height. The unusual development of the neural spines in the dorsal region of course accounts for this excessive height. That there is not, for this reason, a greater slope to the back is explained by the measurements of the two pairs of legs. In *Bison bison* the height of the fore leg is ten inches less than that of the hind leg; in *B. occidentalis* the fore leg is fourteen inches shorter than the hind leg. This strong growth of the posterior members gives the larger bison a racy appearance, and despite the great depth of the body, fifty inches, there is the suggestion of speed and lightness. Possibly this may be due also to the fact that while there is a difference of fourteen inches in the depth of the bodies of the two species, there is a variation of only three inches in width. There is very little difference in the length of the fore leg in the two specimens, but the diameter is materially greater in *B. occidentalis*—a character correlated with the greater weight to be borne. This strengthening of the fore leg is indicated in another way. The diameter of

the humeroradial joint is 23.3 per cent. of the length of the humerus in *B. bison* and 27.4 per cent. in *B. occidentalis,* while a comparison of the femurotibial joint with the femur gives a ratio of 26.1 per cent. in *B. bison* and 26.8 per cent. in *B. occidentalis.*